

REMARKS

In view of the above amendments and the following remarks, reconsideration of the outstanding office action is respectfully requested.

The rejection of claims 1-9 and 12-25 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,156,690 to Hosaka ("Hosaka") is respectfully traversed in view of the above amendments and the following remarks. Support for the amendments to the claims and new claims 26-27 is found, for example, at page 6, line 29 to page 7, line 6, page 11, lines 5-11, and in original claims 3 and 17.

Hosaka relates to a solid catalyst component for polymerization of olefins. The solid catalyst component is obtained by allowing a solid component and an alcohol to come in contact with each other. The solid component is first prepared by allowing a magnesium compound, a titanium compound, and an electron donor compound (e.g., an alcohol, phenol, ether, ester, ketone, acid halide, aldehyde, amine, amide, nitrile, isocyanate, or organic silicon compound) to come into contact with each other, preferably in the presence of a hydrocarbon (see Abstract, col. 2, lines 35-41, col. 4, lines 56-62, col. 6, lines 36-56).

In contrast, claim 1 (and its dependent claims 2-8, 21, and 26) is directed to "[a] process for preparing polyolefin polymerization catalysts comprising the steps of: a) preparing a homogeneous magnesium solution by heating: i) magnesium compounds; ii) alcohols having 6 or more carbon atoms; and iii) hydrocarbon solvents having 6 or more carbon atoms; b) preparing magnesium precipitates by sequentially adding two or more alcohols having 5 or less carbon atoms to the homogeneous solution prepared in step a); c) adding primary organic aluminum compounds or alkylmagnesium halides to magnesium precipitates prepared in step b); d) adding titanium compounds to magnesium precipitates that passed through step c); e) adding secondary organic aluminum compounds or electron donors to the magnesium precipitates that passed through step d); and f) filtering, washing, and drying the magnesium precipitate solution that passed through step e)" and claim 9 (and its dependent claims 10-20, 22-25, and 27) is directed to "[a] process for preparing titanium catalysts for polyolefin polymerization comprising the steps of: a) preparing a homogeneous solution by agitating: i) magnesium compounds; ii) alcohols having 6 or more carbon atoms; and iii) hydrocarbon solvents; b) preparing a mixture by adding two or more alcohols having 5 or less carbon atoms to the homogeneous solution prepared in step a); and c) contacting the mixture prepared in step b) with titanium compounds."

Hosaka neither discloses nor suggests sequentially performing steps a) through c) of claim 1 and then "d) adding titanium compounds to magnesium precipitates that passed through step c)," as required by claim 1 and its dependent claims.

Further, Hosaka neither discloses nor suggests sequentially performing steps a) through b) of claim 9 and then "c) contacting the mixture prepared in step b) with titanium halide compounds," as required by claim 9 and its dependent claims.

Moreover, nowhere does Hosaka disclose or suggest "adding two or more alcohols having 5 or less carbon atoms to the homogeneous solution prepared in step a)" prior to adding titanium compounds, as required by claims 1 and 9 (and their dependent claims) (emphasis added).

In particular, the present invention relates to a process for preparing an olefin polymerization catalyst (e.g., Ziegler-Natta catalyst), which can increase particle size of a polymer and control particle size distribution.

The present invention is directed to a method which comprises reforming a magnesium support before it is reacted with a titanium compound. Specifically, as set forth in claim 1, the present invention comprises: a) heating magnesium compounds, alcohols having 6 or more carbon atoms, and hydrocarbon solvents to form a homogeneous solution; b) adding two or more alcohols having 5 or less carbon atoms to the homogeneous solution to form magnesium precipitates; c) adding an aluminum compound or alkylmagnesium halide to the precipitate; and then d) introducing a titanium compound to prepare a catalyst. As set forth in claim 9, the present invention also comprises: a) agitating magnesium compounds, alcohols having 6 or more carbon atoms, and hydrocarbon solvents to form a homogeneous solution; b) adding two or more alcohols having 5 or less carbon atoms to the homogeneous solution to prepare a mixture; and then c) contacting the mixture prepared in step b) with titanium halide compounds.

In the present invention as claimed in claim 1, the steps of a) to c) correspond to a reforming process of a support. As a reforming agent for a magnesium support in accordance with the present invention, higher alcohols (with six or more carbon atoms), two or more lower alcohols (having five or less carbon atoms), and an aluminum compound or alkylmagnesium halides are used. Thus, the initial support, before it is reacted with a titanium compound, is a magnesium compound reformed by higher alcohols, two or more lower alcohols, and aluminum compound or alkylmagnesium halide.

In contrast, Hosaka teaches "allowing a magnesium compound, a titanium compound, and an electron donor compound to come in contact with each other" to form a

solid component, and then adding an alcohol to the solid component to prepare a catalyst component (see, e.g., Abstract). Thus, there is no disclosure or suggestion in Hosaka of the reaction of magnesium with higher alcohols, two or more lower alcohols, and, for claim 1, an aluminum compound or alkylmagnesium halide, prior to addition of titanium compounds. Moreover, in Hosaka, a basic catalyst component can be prepared by reacting a titanium compound with a magnesium compound, and the catalyst can then be reformed through addition of the electron donor compound and the later addition of an alcohol. In contrast, in claim 1 of the present invention, before it is reacted with a titanium compound, a magnesium support is reformed in steps a) to c), and a titanium compound is finally added to the reformed support to prepare a catalyst. Reforming a magnesium support by the sequential steps of a) to c) prior to adding a titanium compound as in claim 1 and performing the sequential steps of a) to b) prior to adding a titanium compound as in claim 9, in particular, the addition of two or more lower alcohols prior to adding a titanium compound, has the effect of increasing average particle size of the finally prepared catalyst and making average size distribution regular (see, e.g., page 13, lines 26-31). Further, alcohols are generally known to deactivate catalysts. In Hosaka, alcohol is added to a catalyst prepared by reacting magnesium compound with titanium compound. Thus, in Hosaka, the amount of alcohol should be limited or it may completely deactivate catalyst. As an evidence of such, in the examples of Hosaka, only 0.01-0.2 g of alcohol per 10g of catalyst component is used. However, in accordance with the present invention, because alcohols are contacted with the magnesium compound before the magnesium compound is reacted with the titanium compound to form a catalyst, the above problem does not occur.

Therefore, Hosaka fails to teach or suggest "a) preparing a homogeneous magnesium solution by heating: i) magnesium compounds; ii) alcohols having 6 or more carbon atoms; and iii) a hydrocarbon solvents having 6 or more carbon atoms; b) preparing magnesium precipitates by sequentially adding two or more alcohols having 5 or less carbon atoms to the homogeneous solution prepared in step a); c) adding primary organic aluminum compounds or alkylmagnesium halides to magnesium precipitates prepared in step b)" and then "d) adding titanium compounds to magnesium precipitates that passed through step c)," as required by claim 1 and its dependent claims or "preparing a homogeneous solution by agitating: i) magnesium compounds; ii) alcohols having 6 or more carbon atoms; and iii) hydrocarbon solvents," then "preparing a mixture by adding two or more alcohols having 5 or less carbon atoms to the homogeneous solution prepared in step a)," and then "c) contacting the mixture prepared in step b) with titanium halide compounds," as required by claim 9 and

its dependent claims.

Accordingly, the rejection based on Hosaka is improper and should be withdrawn.

The rejection of claims 10-11 under 35 U.S.C. § 103(a) as being unpatentable over Hosaka in view of U.S. Patent No. 5,459,116 to Ro et al. ("Ro") is respectfully traversed in view of the above amendments and the following remarks.

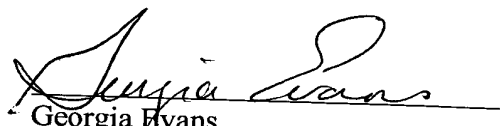
Ro relates to a catalyst for the polymerization of olefins. The catalyst is prepared by directly reacting a magnesium compound of liquid phase (for example, using an alcohol) having no reducing power with a titanium compound of liquid phase in the presence of at least one electron donor which comprises at least one hydroxy group and at least one ester group.

Ro does not cure the above-noted deficiencies of Hosaka and, accordingly, claims 10-11 are patentable over the cited art.

In view of all of the foregoing, applicants submit that this case is in condition for allowance and such allowance is earnestly solicited.

Respectfully submitted,

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